

COMPILATION OF REVIEWER COMMENTS FROM SEPT. 21 FAR INSTALLATION REVIEW

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A. Jonathan Thron

General Comments

Good progress has been made. It will be hard to predict in detail how things will go, so it is good to see that there is flexibility built into the process in the form of being able vary the rate of hiring.

Specific Comments

A number of these comments may already be in Dave Ayres' list from the end of the review.

1) It seems medium likely that beneficial occupancy will slip. A scenario should be worked out for this. What happens to the DOE milestones? I guess the new schedule 44 deals with this...

2) Check Stan's questionnaire people vs. requirements vs. experts at installation vs. Effort9 people. Include those people who are a the mine less than 6 months. In general do another pass through these lists to be sure that there isn't double or under counting.

3) It was mentioned that good documentation is needed to transfer installation and checkout knowledge from the expert to the later installers. I think it is also necessary to have actual time overlap of experts with the experts-in-training.

4) The pseudo-ORC's should be kept to a useful minimum. It could become bureaucratically onerous (e.g. to get approval for plugging in a computer or a desk lamp).

5) Even if no problems are found in checking the first MUX boxes it would be a good idea to do some spot checking. For instance to see if a shipment was mistreated. This should also apply to scintillator modules; even if no problems are seen for a while, it would be a good idea to keep testing at some level.

6) A detailed list is needed of what should be checked on planes. This includes what is checked by the standalone systems (e.g. fiber continuity checker) and what needs to be checked with the DAQ.

7) It was stated that "Once a plane is hung, we will never take it down". This seems to say that the checks done by the DAQ aren't all that important. They would be used for calibration and, maybe, feedback to the factories or the other checks. The purpose of the DAQ checks should be clarified.

8) It may be that more than 5' of workbench area is needed for each work location in the 'Electronics Testing Area'. It sounds as if some people will need racks next to their benches.

Comments from my talk

Below I include the comments and questions that people had during my talk.

9) Don't test HV cables in Electronics Work Area. Maybe even don't test them at all, assume they're good, but include a (few) spares in the cable bundles.

10) MUX box tests will use their own HV supply (not a LeCroy 1440), so they don't need their workspace to be close to the HV test area.

11) Some people questioned whether PC's need 'burning in'. Some people thought they did. In any case it won't take much time.

12) We need more details in the vertical cable trays: are they attached to rack side? Is there interference with sides, doors?

13) Be sure number of racks needed for the control/computer rooms and the electronics work area are included in the request from FNAL.

14) While we need computer connections to the surface building, apartments,..., is a wireless LAN necessary? Could we use dial-in, is it too slow?

B. Philip Harris

On the whole, the installation seems to be planned with extraordinarily high precision and attention to detail -- fantastic. It is somewhat of a concern that there seems to be no "plan B" if anything on this rather tight schedule slips (except for the conviction that plane installation must go on).

There seems to be a big peak in physicist attendance at the mine over the summer: and this is even before taking into account the short-term visitors. We have to ensure that all of these people know what they intend to do; Ely may be a nice place to visit over the summer, but we need people over the winter too, and we should try to avoid a glut followed by shortage.

Remaining problems seem to be fairly clearly identified, and are being dealt with. Examples include the precise allocation of space (upcoming meeting will specify), and the need for review procedures for each system prior to turning on (Earl Peterson volunteered to coordinate this). It is obviously essential that each system should provide adequate documentation, particularly if they expect to hand over installation work to minecrew, and a documentation manager of some kind may be useful.

I am not completely clear about the procedure for light-leak testing, and it is essential that this be done properly before each plane is raised. This issue interacts with my responsibility for the light injection system, since one potential place for light leaks is the light injection module. The single-fibre connectors will have a much tighter tolerance than the plastic connectors used in 4PP, and their better fit should provide improved light

tightness, but I am concerned that the injection-moulded LIM (of which I have seen no examples to date) may prove more difficult to work with because of its thin double wall structure: it may be difficult to get access to the inner wall in order to seal it with RTV (which I believe is the current plan). Tom Chase is investigating this at the moment. Can all of the light-leak testing and continuity checking really be done properly when the time scale calls for one plane per day?

The readout chain is also an area of concern, not helped by the timing clash with the calibration module. However, all involved are aware of the situation, and the vertical slice test will be extremely helpful in ironing out problems in advance.

It has been pointed out that no decision has yet been made formally about whether the first plane is u or v. This needs to be set in stone, as apparently there is an east-west asymmetry in the way the module snouts point, and so it affects fibre length. I hope that by the deadline for receipt of these comments the decision will have been made: default should be first plane is u (which points upwards to the east) as this concurs with clear signal fibre routing plans. It makes sense to have both supermodules starting in the same way, i.e. with u planes, in which case the Monte Carlo would need modification; again, this should be decided one way or the other as soon as possible.

C. Dave Boehnlein

The installation group has made significant progress in many areas since the June review, as indicated by the various progress reports and the detailed schedule presented. In my view, the goals of this project should be in the near term: make as many preparations for the installation process as possible prior to beneficial occupancy of the cavern; intermediate term: establish a routine for the installation of planes (include here testing, installation of ancillary equipment, etc.) in the far detector hall; and long term: keep this routine going until the detector is finished. I believe the group's efforts are properly focused on these goals.

Specific Comments

1) The addition of two planning manager tasks, for safety/QA signoff and documentation management, should be helpful in establishing the routine for detector installation.

2) At the June review, I offered to coordinate minecrew activities for MINOS and CDMS. Since that time, however, Gina Rameika has been named as coordinator of Fermilab activities at Soudan.

3) Survey of the global coordinate system is scheduled to begin on May 1, 2001 and continue for 5 working days. A Fermilab survey crew will be used for this task. Since the beam alignment task (WBS 1.1.6) also calls for a survey crew at Soudan, the effort should be coordinated so as to send one crew one time. This will require a small amount of flexibility in the schedule for this task. Preliminary discussions with the Fermilab Alignment Group indicate the time allocated for the task is adequate.

4) The unresolved issue of whether to use Alner bar holes for module mounting should be addressed as soon as possible. The plan for module survey & alignment is to use the Alner bar holes for the placement of survey targets. The decision on whether or not to use these holes for module mounting will almost certainly affect the type of survey targets that can be used.

D. Jim Kilmer

1. Overall Remarks

The Far Installation team is really starting to pull all of the parts of this task together. Most items seem to be covered pretty well.

2. Itemized suggestions, questions and concerns

- a. The test assembly of a plane with the new strongback will probably now happen in mid-January, 01 because the strongback won't be delivered until Dec. 15th.
 - b. Although I'm sure someone has already looked into it, it would be nice to see if what Lakehead is doing on outfitting will allow us to bring down the strongback and start assembly of it earlier than 5/1/01. It's the biggest part of setting up a workstation and would be the most useful to try and move forward in time.
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E. Earl Peterson

- (1) The installation planning, in general, is about as far along as it makes sense to be. Much further, and it will descend to a level of detail that cannot be maintained when it starts.
 - (2) The most worrying possibility is that the DAQ system will not be available to channel-map the newly hung planes. After the formal presentations, the Indiana group (Stuart) promised to develop a "stand-alone" diagnostic system for the newly MUX'd plane. This should be encouraged.
 - (3) The hiring plan should stay flexible - it may be possible to install one plane per day with fewer crew.
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F. Bob Trendler

I don't have any specific comments to make regarding the review. From what was presented, it seems to me that the project is proceeding at a good pace and that any issues that come up are being addressed.

G. Rob Plunkett

General Comments

This review was a useful follow-up to the previous one. It was particularly nice that certain specific technical areas, such as testing, received more discussion than before. It may well be a good idea to have individual mini-reviews on some of these subjects, lasting only an hour or two with no long followup.

In general, good progress has been made in clarifying issues. This type of analysis is particularly important because of the nature of the task - tying

together all the disparate pieces to make a final detector assembly. The principle overall concern remains getting the necessary manpower, both from the collaboration and from the mine crew, assembled, trained, and effective on the relatively small time scale that still exists.

Specific Concerns

1) Minecrew Labor

Because of the nature of the jobs, which involve rigging and crane operation, only about 6 of the potential mine crew jobs can be handled by physicists even given an infinite supply of them. Therefore the issue of hiring mine crew has no real fallback position and has to be confronted head on. The statement was made that crew can be hired with about 1 month lead time, and, of course, there is no desire to have people on board too early. It would be nice to see some summaries of the types of people who are applying, some discussion of why we expect to be able to get them when we need them. Are any temp agencies being consulted? It is, from my experience, both difficult and time-consuming to hire people, especially if you want good ones. We should be sure that this stays on track.

2) Scintillator Testing.

We need to define specific quality control standards that allow us to decide if we need to perform repairs on a module. This is especially important for the initial mapper testing - it should be defined in terms of changes from the original. It was good to hear about conceptual progress in the checkout that occurs on the steel. I don't believe source-on-a-stick was mentioned -- is it still needed?

3) Electronics and Control Room.

Real progress has been made on the network layout, which makes all our discussions more useful. It is an excellent idea to use the Fermilab LAN setup if it works. Otherwise we will have to fight with our own computer security setup, which will certainly be painful. I recommend that the order of the "Office/Control Room/Trigger Room" group be reversed to keep the electronics nearest to the detector and the office farthest away.

4) Installation plan.

Deliveries still need additional charting out. We need a spec on how the steel, etc. deliveries will be bundled (meaning - how much each delivery and of what type). It will be necessary to have better oversight of the steel support structure installation than was discussed at this review. This is a primary responsibility and must be handled by CNA or some of us. "Won't be there every day" probably is insufficient.

There was a discussion of partitioning the DAQ system at crate level. The DAQ should be encouraged to make sure this is running early (they probably will anyway).

H. Cat James

1. Overall Remarks

The materials handling and installation procedures for the "big" items appears well in hand. Much progress has been made in the tasks

physicists do as opposed to techs (mine crew). If anything, there seemed the potential at one point in time of having a glut of physicists on hand with not enough to do.

2. Itemized suggestions, questions and concerns

(1) I'm really glad to see the various testing procedures worked through in more detail; the amount of time to properly allocate to testing has been a bit of an unknown in both Near and Far installation. Working space allocated for the various tests looks fine in most cases, but a bit overboard in a few : I believe the HV testing I thought a bit overboard has already been addressed (don't need a 1440 for that); the other overboard one is this table for "burning in" PCs for N days before rack mounting them.....if the probability of failure is high, then unbox the PCs in your local apartments, and plug them in there for a few days, and don't bother bringing them underground at all. I frankly think the need for "pre-burn" is overstated.....in the rare case of failure it is not a big deal to replace a rack-mount.

(2) The new "control room" has 3 separated rooms, the actual control room, a public terminal office space, and an office for Bill. The control room is small, with all the rack mounted PCs but only 2 monitors on a table. The public terminal office space is larger. I think those two should be reversed. Proper monitoring of all the software functions running while the detector is operating is going to take more monitor space than the 2 monitors provided. The need for many public terminals is addressed further in the next item, but I think during assembly and commissioning, people who are underground are there to work on making hardware function, and we don't need to provide a pleasant office area. Those commissioning the detector hardware/software interfaces need a workspace where they can see all the software parts in action (DAQ, DCS, Database, Dispatcher, Online Monitor), and this is the Control Room....with more than the two monitors shown now.

(3) The LAN plans show the DAQ having it's own loop, as it should; but it also shows the DCS having it's own loop, separate from the general experiment area loop. Why? This is not true in the Near Hall, and indeed is not true for most Fixed Target setups here at FNAL. What we call the DCS is often called "Slow Control" around here, and it is called that because the data transmission rates are not high and not time-critical to experiment operation, and therefore can exist easily on the same loop as is used for general purpose "public terminals" located within experiment halls. From what I know of the MINOS DCS, this holds true for MINOS.

(4) While the review is on installing the detector, some amount of time and money is being spent on the creation of various workspaces. I feel there is an assumption built into these plans on how the detector is operated after commissioning, and the assumption is that physicists spend shifts underground, and therefore need "public work space", essentially for non-shift work (checking email, working on analysis software, etc). We need to discuss what we really plan to do to operate the detector after commissioning. The MINOS detector is more passive than the Soudan detector, and there is no need for people to sit next to it once it is up and running smoothly. (physicists don't sit next to the Soudan detector everyday either). The "public terminal" space mentioned above does not perhaps need to be so large, and maybe not even in it's own room.....why not where Soudan terminals are located now, for example? We don't need a "comfortable" place to check email underground if we only need to provide that functionality for a relatively (over the life of the detector) brief time. However I think another working group, on Soudan Operations, needs

to address this issue in more detail, but start soon, so decisions can be fed back into the outfitting plans.

I. Stuart Mufson

1. confirmation that MUX box space and cable space for testing in the mine will be separate (5'/task)
 2. still unsure where MUX boxes are to be stored; too heavy to be stored where they must be carried up a ladder
 3. implementation of the plan to have an HV-PMT interlock so that tubes on both sides of the detector are powered off before a MUX box is opened
 4. we have designed a board that reads out analog signals from MUX boxes; this readout can be used to check for light leaks whether or not the DAQ is ready
 5. there needs to be separate HV for MUX boxes
 6. check-out of MUX boxes requires a learning curve; unclear when this task can be assumed by the mine crew
 7. the physicist effort at Soudan (9/19/00) is incorrect; there will be two graduate students from Indiana taking 6 months at the experiment (probably Q3/01, Q4/01, Q3/02, Q4/02) -- that takes 1 FTE from the estimate from Indiana
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J. Bob Webb

1. Overall Remarks

This plan is really taking shape. With the work that has been carried out since the Ely Meeting, the group has looked into nearly all of the installation issues in some detail now. Based on these plans and the manpower expected to be available, the installation task plan looks quite reasonable at this time.

2. Itemized suggestions, questions and concerns

- (1) While there has been some progress made on the planning for the work that will need to be done on the completed planes (light leak checking, fiber transmission tests, LIM tests), it is not yet clear how much time these checks may take on average. This will continue to be tough to pin down until we get some experience with the materials coming from the various factories to the Soudan mine and how they check out at the mine.
- (2) From DA's presentation, it appears that much of the outfitting oversight will be supplied by members of our installation team. We need to make sure that all involved are plugged into the important issues here, before things get too far along.
- (3) It was noted during this review that a plan for developing an "operational readiness review" of all relevant tasks must be developed for the far detector site. This is a high priority issue, given the schedule for beginning detector assembly.

